

SCIENCE, AERONAUTICS AND TECHNOLOGY

FISCAL YEAR 2001 ESTIMATES

BUDGET SUMMARY

OFFICE OF AERO-SPACE TECHNOLOGY

COMMERCIAL TECHNOLOGY PROGRAMS

SUMMARY OF RESOURCES REQUIREMENTS

	FY 1999 OPLAN <u>12/23/99</u>	FY 2000 OPLAN <u>REVISED</u> (Thousands of Dollars)	FY 2001 PRES <u>BUDGET</u>	Page <u>Number</u>
Commercial Programs.....	33,498	35,049	29,200	
Technology Transfer Agents.....	12,200	7,356	5,800	
Small Business Innovation Research Programs	<u>94,654</u>	<u>97,600</u>	<u>100,000</u>	
Total.....	<u>140,352</u>	<u>140,005</u>	<u>135,000</u>	
Johnson Space Center	14,725	15,473	14,393	
Kennedy Space Center.....	7,398	6,111	5,466	
Marshall Space Flight Center	20,075	20,874	20,536	
Stennis Space Center.....	3,638	3,704	4,986	
Ames Research Center	11,994	13,329	13,238	
Dryden Flight Research Center	3,619	3,659	4,941	
Langley Research Center.....	17,413	17,167	16,087	
Glenn Research Center.....	23,321	23,953	21,129	
Goddard Space Flight Center.....	30,411	30,849	29,338	
Jet Propulsion Laboratory	3,082	2,916	2,916	
Headquarters	<u>4,676</u>	<u>1,970</u>	<u>1,970</u>	
Total.....	<u>140,352</u>	<u>140,005</u>	<u>135,000</u>	SAT 4.2-2

BASIS OF FY 2001 FUNDING REQUIREMENT

COMMERCIAL TECHNOLOGY PROGRAM

	FY 1999 OPLAN <u>12/23/99</u>	FY 2000 OPLAN <u>REVISED</u>	FY 2001 PRES <u>BUDGET</u>
	(Thousands of Dollars)		
Commercial Programs	33,700	35,049	29,200
Baseline Commercial Programs	(28,700)	(29,100)	(29,200)
Special Interest Projects.....	(5,000)	(5,949)	--
Technology Transfer	12,200)	7,356	5,800
Baseline Tech Transfer Agents.....	(7,200)	(5,800)	(5,800)
Special Interest Projects.....	(5,000)	(1,556)	--
Small Business Innovative Research Program	<u>94,452</u>	<u>97,600</u>	<u>100,000</u>
Total Commercial Technology Programs	<u>140,352</u>	<u>140,005</u>	<u>135,000</u>

PROGRAM GOALS

NASA's Commercial Technology Program includes Commercial Programs, Technology Transfer Agents and the Small Business Innovative Research (SBIR) Program. NASA's Commercial Technology Program facilitates the transfer of NASA inventions, innovations, discoveries or improvements developed by NASA personnel or in partnership with industry/universities to the private sector for commercial application leading to greater U.S. economic competitiveness.

The goal of Commercial Programs is to share the harvest of NASA's technology programs with the U. S. industrial/scientific community. The goal encompasses the commercialization of technology developed in all the Agency's Enterprises, in past as well as current programs. The NASA Commercial Program mission includes a variety of mechanisms for achieving its goals: partnerships with industry/academia; federal/state/local alliances; emphasis on commercialization in new R&D procurements; electronic commerce; training and education of NASA employees/contractors; employee accountability; and application of performance goals/metrics.

The goal of Technology Transfer Agents is to facilitate the transfer of NASA and other federally sponsored research and technology (and associated capabilities) to the U. S. private sector for commercial application. The purpose of this program goal is to enhance U. S. industrial growth and economic competitiveness.

The goal of NASA's Small Business program is to promote the widest possible award of NASA research contracts to the small business community as well as to promote commercialization of the results of this research by the small business community. Established by Congress, the SBIR program (which includes NASA's Small Business Technology Transfer (STTR) programs) helps NASA develop innovative technologies by providing competitive research contracts to U.S.-owned small businesses.

STRATEGY FOR ACHIEVING GOALS

Commercial Programs

Commercial Programs introduces a new way of doing business that involves a mix of practices/mechanisms which enable the Agency to more closely align its way of doing business with that of the private sector. The common denominator in these practices is technology partnerships. Technology partnerships are business arrangements among the government, industry, and/or academia wherein each party commits resources to the accomplishment of mutually agreed upon objectives and shares the risks and rewards of the endeavor.

The success of Commercial Programs is accomplished through:

- An extensive outreach program (technology dissemination and marketing);
- An electronic commerce/information network (via the Internet) that greatly facilitates the transfer of technology and allows very efficient implementation of our technology business contacts and services;
- Training and education of NASA employees to emphasize program relevance to national needs and to facilitate program implementation; and
- The use of metrics that address day-to-day management processes as well as bottom-line results.

Technology Transfer Agents

Technology Transfer Agents facilitate the transfer/use of NASA and other Federally sponsored research and technology (and associated capabilities) to the U. S. private sector for commercial application to enhance U. S. industrial growth and economic competitiveness. Technology Transfer Agents include funding for the National Technology Transfer Center (NTTC) at Wheeling Jesuit College in West Virginia and the TechLink Center at Montana State University.

In conformance with Congressional direction, NASA has funded the NTTC since 1990. The NTTC serves as a national resource for the transfer and commercialization of federal research and technology. A key, on-going strategy is to align and integrate NTTC operations with the NASA Commercial Technology Programs in support of the NASA Commercial Technology Mission. This strategy provides a foundation upon which the NTTC may fulfill its national role through technology transfer programs funded by other federal agencies and the provision of cost-recovery products and services. Accordingly, NASA has facilitated the involvement of other federal agencies to leverage and extend NTTC capabilities funded by NASA and has enabled the NTTC to implement cost-recovery activities in support of the overall federal technology transfer mission. The NTTC performs four core roles: (1) Serve as a national gateway for federal technology transfer and commercialization, assisting U. S. industry to locate and access NASA and other federally-sponsored technology resources and sources of technical/business assistance; (2) Assess NASA and other federal technologies for commercial potential, and facilitate partnerships for technology commercialization; (3) Develop and deliver professional-level training in technology transfer and commercialization for NASA, federal agencies and other public and private sector audiences; and (4) Promote U. S. industry awareness and utilization of NASA and other federally sponsored research and technology resources available for commercial purpose.

Also in conformance with Congressional direction, NASA funded a 4-year cooperative agreement with Montana State University (in FY 1996) to establish and operate the TechLink Center, a rural technology transfer and commercialization center. The mission of the TechLink Center is to assist firms and targeted industries in Montana, North Dakota, South Dakota, Wyoming and Idaho to utilize and commercialize technologies from NASA, federal laboratories and universities.

Small Business Innovative Research Program

The Small Business Innovation Research (SBIR) program helps NASA develop innovative technologies by providing competitive research contracts to U.S.-owned small businesses. The program is structured in three phases. Phase I is the opportunity to establish the feasibility, technical merit, and NASA mission need of a proposed innovation. Selected competitively, Phase I contracts have a term of six months and currently do not exceed \$70,000. Phase II is the major R&D effort in SBIR. The most promising Phase I projects are selected to receive contracts worth up to \$600,000 and have a term of up to two years. Approximately 50 percent of Phase I projects are approved for Phase II. Phase III is the completion of the development of a product or process to make it marketable. SBIR program funding cannot be used to support the Phase III program. Private sector investment and sales of products and services based on the SBIR technology is the usual source of Phase III funding.

SCHEDULES & OUTPUTS

Commercial Programs

FY 1999

Assess approximately 100% of NASA technology for commercial application.

Expand training program for NASA R&D program managers

Plan

December 1998

September 1999

Actual/Revised

December 1998

September 1999

FY 2000

Increase percentage of NASA R&D invested in commercial partnerships with a goal of achieving 15-20 percent.

Complete deployment of quarterly automated metrics reporting module at all NASA centers.

Complete deployment of electronic new technology reporting (eNTRe) at all NASA centers.

December 1999

June 2000

September 2000

December 1999

FY 2001

Update commercial assessment of NASA activities

Increase partnership percent to 20 percent

Incorporate NASA facilities as integral part of commercial assessment process.

December 2000

December 2000

December 2000

Technology Transfer Agents

FY 1999

Deliver, through a partnership between the NTTC and NASA, 10 Commercial Technology training courses in FY 1999.

Service a minimum of 16,000 inquiries and produce at least 750 qualified referrals for NASA technologies in FY 1999.

Increase the assessment/partnering between NASA and industry. Complete 25 in-depth commercialization potential assessments of NASA technologies. .

Facilitate venture financing for 10 NASA SBIR firms.

Assist partnering agreements for 10 NASA technologies.

Plan

Actual/Revised

September 1999

September 1999

September 1999

September 1999

September 1999

September 1999

September 1999

September 1999

September 1999

September 1999

FY 2000

Deliver, through a partnership between the NTTC and NASA, 10 Commercial Technology training courses in FY 2000.

Service a minimum of 16,000 inquiries and produce at least 750 qualified referrals for NASA technologies.

Complete 25 in-depth commercialization potential assessments of NASA technologies.

Facilitate the formation of licensing/partnership agreements for 10 NASA technologies.

Facilitate/broker 7 technology partnerships involving regional firms/organizations and NASA technology, research/technology objectives or capabilities.

September 2000

September 2000

September 2000

September 2000

May 2000

FY 2001

Deliver, through a partnership between the NTTC and NASA, 10 Commercial Technology training courses in FY 2001.

Service a minimum of 16,000 inquiries and produce at least 750 qualified referrals for NASA technologies.

Complete 25 in-depth commercialization potential assessments of NASA technologies.

Facilitate the formation of licensing/partnership agreements for 10 NASA technologies.

Facilitate/broker 7 technology partnerships involving regional firms/organizations and NASA technology, research/technology objectives or capabilities.

September 2001

September 2001

September 2001

September 2001

May 2001

Small Business Innovative Research Program

FY 1999

Complete development and issue the FY 1999 SBIR Phase I solicitation via the internet.
Electronic submission of proposals via the internet.

Plan

April 1999

July 1999

September 1999

Actual/Revised

April 1999

July 1999

September 1999

FY 2000

Select and announce SBIR FY 1999 Phase I awards.
Complete development and issue the FY 2000 SBIR Phase I solicitation.
Complete automated processing from solicitation to proposal evaluation.
Select and announce SBIR FY 1999 Phase II awards

October 1999

April 2000

August 2000

August 2000

FY 2001

Select and announce SBIR FY 2000 Phase I awards.
Complete development and issue the FY 2001 SBIR Phase I solicitation.
Select and announce SBIR FY 2000 Phase II awards

October 2000

April 2001

August 2001

ACCOMPLISHMENTS AND PLANS

Commercial Programs

In FY 1999, the emphasis of Commercial Programs was on showing steady improvement toward increasing the percentage of the NASA R&D budget in commercial partnerships. Piloting the distance learning project and delivering several classroom training sessions with increased NASA participation helped foster the Agency's internal culture change and further improved commercial technology program performance. Also in FY 1999, deployment of electronic new technology reporting (eNTRe), which provides innovators and researchers a secure desktop tool for identifying and reporting new technologies and innovations, was initiated. In conformance with FY 1999 Congressional direction pertaining to appropriation action, the following was initiated: (1) Established the Women/Minority program in partnership with the HUD Enterprise Zone program which leverages the NASA TechTracS electronic commerce activity; (2) Partnered with Florida Technology Research & Development Agency (TRDA) to support the expansion of technology incubators in Florida, and with the Montana Big Sky Economic Development Authority which has launched an incubator in Billings, MT; and (3) Expanded the Glenn Research Center Garrett Morgan project to increase the outreach and support to the small, minority business community in the mid-west region.

In FY 2000, commercial partnerships with industry will increase and the technology and partnership database will be refined, updating it to include new Agency contracting efforts and describe new technologies that will be made public via the electronic

network. Increase the percentage of the NASA R&D budget in commercial partnerships with industry to approach 20 percent in FY 2000. Continue to improve the utilization of the Internet as an electronic marketplace for NASA technology assets, facilitating technology transfer and commercialization opportunities between U.S. industry and NASA. Expand training opportunities focused on commercial technology strategy and its implementation within NASA's management training program. Establish a pilot project to create Strategic Technology Development Partnerships with one non-aerospace industry sector to meet the goal of establishing joint-sponsored R&D projects with industry to share risk and cost in the development of new technologies critical to NASA missions.

The following Congressional programmatic activities will be performed in FY 2000: (1) continuation of the Software Optimization and Reuse Program (SORT), which was created to institutionalize and systemize process-driven, domain-specific, architecture-centric software reuse technology in NASA; (2) establishment of a cooperative relationship with the newly-created NASA Illinois Commercialization Center (NICC) and the Illinois Coalition; (3) the Miami-Dade Community College will establish a technology-oriented business incubator in the Homestead region; and, (4) development (in partnership with FEMA, NOAA, National Weather Service, AirTouch and AEPTEC) of a large-scale personal warning system which will serve as an alert to national disasters.

NASA plans to maintain 20 percent of the NASA R&D budget in commercial partnerships with industry in FY 2001. NASA plans to have a fully operational Commercial Technology Training syllabus and curriculum accessible by NASA employees. The Commercial Program plans to expand services offered to each of the four NASA Enterprises and establish Multi-Center Technology Development Partnerships with at least two non-aerospace industry sectors to meet the goal of establishing joint-sponsored R&D projects with industry that will share risk and cost in the development of new technologies critical to NASA missions.

Technology Transfer Agents

The National Technology Transfer Center (NTTC) is a national resource for NASA and federal technology transfer and commercialization. The NTTC performed as a national gateway for NASA technology, servicing 16,000 inquiries and producing 450 qualified leads versus the 750 planned qualified referrals. The decrease in qualified leads was due to increased lead screening to yield higher potential opportunities. The NTTC completed 25 in-depth commercialization potential assessments of NASA technologies and facilitated venture financing for 10 NASA SBIR firms, and qualified and assisted licensing/partnering agreements for 10 NASA technologies. NTTC's technology transfer activities will continue under the newly established cooperative agreement

TechLink facilitated 15 technology partnerships with regional firms/organizations and NASA research technology. TechLink brokered and supported a partnership between NASA/JSC and a Montana biotechnology firm, leading to the discovery of the extreme gamma radiation resistant qualities of a micro-organism and derived compounds that have significant potential for NASA and commercial applications, including the "hardening" of space electronics. Also to TechLink's credit, TechLink facilitated/brokered 9 additional partnerships involving other federal technology, for a total of 24 partnerships (versus the goal of 15).

In FY 2000, 10 technology commercialization training sessions/events are to be delivered to NASA personnel, including Internet-based training, to implement required skills and best practices throughout NASA. The NTTC performs as a national gateway for NASA technology, servicing 16,000 inquiries for NASA technology and producing 450 qualified referrals to NASA centers for technology transfer/commercialization partnerships. The NTTC is to complete, in-depth commercialization potential assessments of 25 NASA technologies and assist the formation of licensing/partnership agreements for 10 NASA technologies. The NTTC plans to facilitate/broker 7 technology partnerships involving regional firms/organizations and NASA technology, research/technology objectives or capabilities by May 2000.

The following Congressional programmatic activities will be performed in FY 2000: (1) continuation of the Garret-Morgan initiative in Ohio to assist in the establishment of Women-Owned/Minority-Owned Businesses; and (2) an augmentation to the NTTC.

In FY 2001, the NTTC will deliver 10 technology commercialization training sessions/events to NASA personnel, including Internet-based training, to implement required skills and best practices throughout NASA. The NTTC will continue to perform as a national gateway for NASA technology, servicing almost 20,000 inquiries for NASA technology and producing almost 500 qualified referrals to NASA centers for technology transfer/commercialization partnerships. The NTTC will complete in-depth commercialization potential assessments of 25 NASA technologies, and assist the formation of licensing/partnership agreements for at least 10 NASA technologies. The TechLink Center will continue to assist firms and targeted industries in Montana, North Dakota, South Dakota, Wyoming and Idaho to utilize and commercialize technologies from NASA, federal laboratories and universities.

Small Business Innovative Research Program

In accordance with the Small Business Innovation Development Act of 1982, the actual SBIR funding level for the Agency is determined based on the results of a detailed analysis of the actual obligations for the most recent fiscal year that data is available. For FY 1999 and FY 2000, the funding levels are based on actual data. For FY 2001, the funding level shown for SBIR is a placeholder that is used for planning purposes only. In early FY 2001, the Office of the Comptroller will perform a detailed assessment on the Agency's most recent actual data. If the results of the assessment conclude that the actual SBIR funding level varies from the budgeted amount, that change will be reflected in the Agency's initial operating plan to Congress.

The NASA SBIR program has contributed to the U. S. economy by fostering the establishment and growth of over 1,100 small, high technology businesses. More than 430 private ventures have been initiated based on NASA SBIR programs. Over one hundred of the SBIR Phase II firms have produced Phase III agreements generating at least \$1 million per firm in new revenues.

In FY 1999, a commercialization survey of all companies receiving NASA SBIR Phase II awards between 1983 and 1994 was completed. Approximately 125 SBIR FY 1997 Phase II research proposals were selected for award in January 1999. The selected projects totaled approximately \$73 million and were conducted by 113 small, high-technology firms located in 26 states. Selection of 345 research proposals for awards for NASA's SBIR FY 1998 Phase I Solicitation was completed in October 1998. The solicitation for SBIR FY 1999 Phase I was issued on schedule in April 1999. Over 99 percent of Phase I proposals were submitted online and processed electronically as opposed to the 50 percent in FY 1998.

The FY 1999 NASA SBIR solicitation included 25 major topic areas divided into 94 sub-topics. The description of each of these sub-topics is developed by various NASA installations to include current and foreseen Agency program needs and priorities. NASA typically receives over 2,000 proposals. For each solicitation, proposals are evaluated by the NASA field centers for scientific and technical merit, key staff qualifications, soundness of the work plan, and plans for commercial application. NASA Headquarters (HQ) program offices provide additional insight regarding commercial, program balance, and critical Agency requirements. Selections are made by NASA HQ, based upon these recommendations, and other considerations. NASA continues to extensively utilize the Internet to administer the program. NASA also provides information for public access via a bulletin board service and other Internet information servers. Moreover, NASA continues to increase its use of the Internet and information technology in its operational processes including the development of the technical solicitation sub-topics; for public release of the solicitation in a variety of electronic formats; and for proposal evaluation. The end-to-end electronic solicitation process is serving as a resource not only within NASA, but is being viewed as a prototype for other government agencies. One of the four stated purposes of the SBIR

program is to “Emphasize the program goal of increasing private sector commercialization of technology developed through federal research and development” (P.L. 102-564, Small Business Research and Development Enhancement Act of 1992). According to the U.S. Small Business Administration’s SBIR Policy Directive, commercial feasibility of an SBIR proposal is a selection criteria requirement.

Several other innovations continued to strengthen small business programs. External evaluation of each proposal's ultimate commercial potential is now a foundational part of the selection process. In addition, a comprehensive survey of past SBIR projects’ Phase III commercialization and/or mission application continues to be conducted. The information from the review/survey will be used to identify critical predictors of commercial viability and, therefore, be used to increase the effectiveness of the program’s commercialization efforts. Finally, the process of mapping several sub-topics into specific NASA mission applications continues to be a focus for strategic planning activities, with the intent to more closely tie the SBIR program with the primary mission needs of each NASA Enterprise.

In FY 2000, the commercialization survey will be extended to include commercial results for Phase II's awarded by NASA in 1995. Approximately 290 SBIR FY 1999 Phase I awards will be reviewed and selected by October 1999. Approximately 190 SBIR FY99 Phase II awards will be reviewed and selected by August 2000. It is our intent to achieve a 100 percent fully automated process, from proposal receipt to final report submission, pending adoption of federal & NASA electronic signature standards.

In FY 2001, the commercialization survey will be extended to include commercial results for Phase II's awarded by NASA in 1996/97. The FY 2000 SBIR Phase I awards will be selected by October 2000. The SBIR FY 2000 Phase II awards will be selected by August 2001.